

WHAT IS CLAIMED IS:

1. A communication device comprising:

5 a selection unit which selects one of a relay  
protocol designed to transmit the communication data to  
a receiving-side communication device via a control  
station, and a direct protocol designed to directly  
transmit the communication data to the receiving-side  
communication device, in accordance with a condition  
that defines a state wherein a total communication  
10 bandwidth used to transmit the communication data does  
not exceed an allowable communication bandwidth and is  
used to switch a protocol between the relay and direct  
protocols; and

15 an interface unit which transmits the  
communication data in accordance with the protocol  
selected by the selection unit.

2. A device according to claim 1, further  
comprising:

20 a unit which detects real-time data to be  
transmitted to the receiving-side communication device,  
and

25 wherein the selection unit selects the relay  
protocol when the real-time data is not detected, and  
selects the direct protocol when the real-time data is  
detected.

3. A device according to claim 1, further  
comprising:

a unit which acquires a communication bandwidth of the communication data;

5 a unit which calculates a total communication bandwidth required upon transmitting the communication data in accordance with the relay protocol on the basis of the communication bandwidth of the communication data; and

10 a unit which determines whether or not the total communication bandwidth satisfies a condition that defines a state in which the total communication bandwidth exceeds an allowable communication bandwidth of a network used to transmit the communication data, and

15 wherein the selection unit selects the relay protocol when the condition is not satisfied, and selects the direct protocol when the condition is satisfied.

4. A device according to claim 1, further comprising:

20 a unit which acquires a communication bandwidth of the communication data;

a first acquisition unit which acquires an allowable communication bandwidth to the control station based on the relay protocol;

25 a second acquisition unit which acquires an allowable communication bandwidth from the control station to the receiving-side communication device

based on the relay protocol; and

5       a unit which determines whether or not the  
communication bandwidth of the communication data  
satisfies a first condition that defines a state in  
which the communication bandwidth exceeds the allowable  
communication bandwidth to the control station, and  
whether or not the communication bandwidth of the  
communication data satisfies a second condition that  
defines a state in which the communication bandwidth  
10       exceeds the allowable communication bandwidth from the  
control station to the receiving-side communication  
device, and

      wherein the selection unit selects the relay unit  
when neither of the first and second conditions are  
15       satisfied, and selects the direct protocol when at  
least one of the first and second conditions is  
satisfied.

5. A device according to claim 1, further  
comprising:

20       a unit which acquires a communication bandwidth of  
the communication data;

      a unit which acquires an allowable communication  
bandwidth based on the direct protocol; and

25       a unit which determines whether or not the  
communication bandwidth of the communication data  
satisfies a condition that defines a state in which  
the communication bandwidth exceeds the allowable

communication bandwidth based on the direct protocol,  
and

wherein the selection unit selects the direct  
protocol when the condition is not satisfied, and  
5 selects the relay protocol when the condition is  
satisfied.

6. A device according to claim 1, further  
comprising:

a unit which reserves a communication bandwidth  
10 required to transmit the communication data in  
accordance with the relay protocol, and cancels  
the reserved communication bandwidth and reserves  
a communication bandwidth required to transmit the  
communication data in accordance with the direct  
15 protocol when the selection unit selects the direct  
protocol, and

wherein the interface unit transmits the  
communication data using the reserved communication  
bandwidth.

20 7. A communication method for transmitting  
communication data to a receiving-side communication  
device, comprising:

selecting one of a relay protocol designed to  
transmit the communication data to the receiving-side  
25 communication device via a control station, and  
a direct protocol designed to directly transmit the  
communication data to the receiving-side communication

device, in accordance with a condition that defines a state wherein a total communication bandwidth used to transmit the communication data does not exceed an allowable communication bandwidth used to transmit communication data; and

transmitting the communication data in accordance with the selected protocol.

8. The communication method as recited in claim 7, further comprising the steps of:

detecting real-time data to be transmitted to the receiving-side communication device, and

wherein the selecting step selects the relay protocol when the real-time data is not detected, and selects the direct protocol when the real-time data is detected.

9. The communication method as recited in claim 7, further comprising the steps of:

acquiring a communication bandwidth of the communication data;

calculating a total communication bandwidth required upon transmitting the communication data in accordance with the relay protocol on the basis of the acquired communication bandwidth of the communication data; and

determining whether or not the total communication bandwidth satisfies a condition that defines a state in which the total communication bandwidth exceeds

an allowable communication bandwidth of a network used to transmit the communication data, and

wherein the selecting step selects the relay protocol when the condition is not satisfied, and  
5 selects the direct protocol when the condition is satisfied.

10. The communication method as recited in claim 7, further comprising:

a first acquisition step which acquires an  
10 allowable communication bandwidth to a control station based on the relay protocol;

a second acquisition step which acquires an allowable communication bandwidth from the control station to the receiving-side communication device  
15 based on the relay protocol; and

a step of determining whether or not the communication bandwidth of the communication data satisfies a first condition that defines a state in which the communication bandwidth exceeds the allowable  
20 communication bandwidth to the control station, and whether or not the communication bandwidth of the communication data satisfies a second condition that defines a state in which the communication bandwidth exceeds the allowable communication bandwidth from the  
25 control station to the receiving-side communication device, and

wherein the selecting step of selects the relay

unit when neither of the first and second conditions are satisfied, and selects the direct protocol when at least one of the first and second conditions is satisfied.

5           11. The communication method as recited in claim 7, further comprising the steps of:

          acquiring a communication bandwidth of the communication data;

          acquiring an allowable communication bandwidth  
10       based on the direct protocol; and

          determining whether or not the communication bandwidth of the communication data satisfies a condition that defines a state in which the communication bandwidth exceeds the allowable communication  
15       bandwidth based on the direct protocol, and

          wherein the selecting step selects the direct protocol when the condition is not satisfied, and selects the relay protocol when the condition is satisfied.

20           12. A computer readable recording medium that records a program, said program when executed by a computer causing the computer to execute the steps of:

          selecting one of a relay protocol designed to transmit communication data to a receiving-side  
25       communication device via a control station, and a direct protocol designed to directly transmit the communication data to the receiving-side communication

device, in accordance with a condition that defines  
a state wherein a total communication bandwidth used  
to transmit the communication data does not exceed  
an allowable communication bandwidth used to transmit  
communication data; and

transmitting the communication data in accordance  
with the selected protocol.

13. The computer readable recording medium as  
recited in claim 12, wherein said computer is operable  
for:

detecting real-time data to be transmitted to the  
receiving-side communication device, and

wherein the selecting step selects the relay  
protocol when the real-time data is not detected, and  
selects the direct protocol when the real-time data is  
detected.

14. The computer readable recording medium as  
recited in claim 12, wherein said computer is operable  
for:

acquiring a communication bandwidth of the  
communication data;

calculating a total communication bandwidth  
required upon transmitting the communication data in  
accordance with the relay protocol on the basis of the  
acquired communication bandwidth of the communication  
data; and

determining whether or not the total communication

bandwidth satisfies a condition that defines a state in which the total communication bandwidth exceeds an allowable communication bandwidth of a network used to transmit the communication data, and

5            wherein the selecting step selects the relay protocol when the condition is not satisfied, and selects the direct protocol when the condition is satisfied.

15            15. The computer readable recording medium as recited in claim 12, wherein said computer is operable to perform:

            a first acquisition step which acquires an allowable communication bandwidth to a control station based on the relay protocol;

15            a second acquisition step which acquires an allowable communication bandwidth from the control station to the receiving-side communication device based on the relay protocol; and

20            a step of determining whether or not the communication bandwidth of the communication data satisfies a first condition that defines a state in which the communication bandwidth exceeds the allowable communication bandwidth to the control station, and whether or not the communication bandwidth of the  
25            communication data satisfies a second condition that defines a state in which the communication bandwidth exceeds the allowable communication bandwidth from the

control station to the receiving-side communication device, and

wherein the selecting step of selects the relay unit when neither of the first and second conditions are satisfied, and selects the direct protocol when  
5 at least one of the first and second conditions is satisfied.

16. The computer readable recording medium as recited in claim 12, wherein said computer is operable  
10 for:

acquiring a communication bandwidth of the communication data;

acquiring an allowable communication bandwidth based on the direct protocol; and

15 determining whether or not the communication bandwidth of the communication data satisfies a condition that defines a state in which the communication bandwidth exceeds the allowable communication bandwidth based on the direct protocol, and

20 wherein the selecting step selects the direct protocol when the condition is not satisfied, and selects the relay protocol when the condition is satisfied.